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Handle With Care: Integrating Caring Content in Mathematics and Science Methods Classes

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Abstract. It is a well-known theory and practice among early childhood educators that building early relationships with the children is crucial to their development. However, there is irony in the fact that many teacher education programs that propose to model "best practices" do not model relationship building with their preservice teachers. This study examines two methods courses that integrated the ethic of care within their science and mathematics pedagogy as an avenue to operationalize the "relational zone." Two cohorts of 24 and 20 female preservice early childhood teachers participated in the study. The students were enrolled in science and mathematics classes that emphasized integration and an ethic of care. Integration included joint syllabi, discussions, joint assignments, and co-teaching by both teacher educators. Caring practices were modeled and practiced within the courses. The participants responded to 10 prompts by writing journal entries. Qualitative analysis of the students' journals revealed that they understood and practiced caring content in the context of science and mathematics teaching. The findings are discussed in terms of modeling relationship building with preservice teachers.

In recent years there have been widespread calls for the integration of science and mathematics instruction as an avenue to increase children's performance in these content areas (Berlin, 1994; Berlin & White, 1994; Lederman & Niess, 1998). In early childhood education, the concept of curricular integration is practically ubiquitous. It is a common practice in early childhood education to establish caring relationships with the children, then teach an integrated curriculum. When examining early childhood curriculum textbooks (Gestwicki, 1999; Jalongo & Isenberg, 2000; Trister Dodge, Jablon, & Bickart, 1994), the first few chapters typically focus on building relationships and getting to know the children. Then, in subsequent chapters, the authors discuss the subject content (such as mathematics and science). Early childhood educators understand that building caring relationships with children is cru-

cial to their emotional and intellectual development. Arguably, it is this relationship focus that is often missing from early childhood preservice teacher education programs and college courses in general (Thayer-Bacon & Bacon, 1996). Preservice teacher education programs should integrate relationship building strategies with their preservice teachers as well as impart curriculum content. The authors believe that it is the responsibility of teacher educators to model trusting and caring relationships, in order to help preservice teachers enter into trusting and caring relationships with the children they teach.

It is often claimed that the model of a typical professor is one who dispenses wisdom through a lecture format, leaving the responsibility of making sense of what is said with the student (Thayer-Bacon & Bacon, 1996). Recently, however, the emphasis and research on caring relationships at the uni-

versity level has become much more prominent (Goldstein & Lake, 2000, 2003; Greene, 1990; Lake, 2003; McLaughlin, 1991; Noddings, 1996; Thayer-Bacon & Bacon, 1996). Like Dewey (1916) and Montessori (1966), contemporary researchers are calling for learning environments that “strive for active, engaged learning that arises out of real questions and concerns students have, learning that takes place in a setting that treats the student as a whole person, not just a mind” (Thayer-Bacon & Bacon, 1996, p. 54). The word most often used throughout the literature to describe this new type of educator is “caring.”

Generally, when educators write about caring, their understanding of the term is rooted in the work of Noddings (1984). Throughout her book *Caring: A Feminine Approach to Ethics and Moral Education*, Noddings moves the reader away from the education system’s traditional, male perspective of viewing morality, which is based on principles and propositions, and toward a woman’s perspective of viewing morality—one that is “based on human caring and the memory of caring and being cared for” (p. 1). In short, Noddings calls for an ethic of care in teaching that is focused on fidelity.

Fidelity in Teaching and Teacher Education

“Fidelity” is not a word often associated with teaching and teacher education. Noddings (1986) asserts that fidelity may be too narrowly defined if we use the utilitarian and Kantian (1981) definition that fidelity to individuals is derived from fidelity to principle. Fidelity to person, then, is seen as a possible duty. Noddings provides an alternative view of fidelity more in line with her ethic of care theory. She states that “fidelity is not seen as faithfulness to duty or principle but as a direct response to individuals with whom one is in relation. . . . [F]idelity is the quality of the relation and not merely an attribute of an individual moral agent’s behavior or character” (Noddings, 1986, p. 497). Therefore, fidelity is inherent in all relationships, as

it has at its heart the person and the quality of the relation. Those utilizing the ethic of care do not ask if it is their duty to be faithful to the relationship. For them, fidelity is not an attribute of a relationship; it is the quality of the relationship. Fidelity can be viewed as the precondition for entering into a relationship, as well as the substance for maintaining the relationship (Noddings, 1986).

Noddings (1986) states that “if caring is central to teaching, we must strive to produce caring teachers and then, of course, prove that we have done so” (p. 502). Many teacher educators treat preservice students quite differently than how they expect their preservice students to treat the children under their charge. “[O]ften, indeed, preservice teachers are treated rather harshly by professors who claim ‘to care about the children’ who will be taught by the new teachers” (Noddings, 1986, p. 503). Greene’s (1990) research supports this notion; she reported that larger institutions of learning force teachers to be detached in a manner that is contradictory to their goals as teachers. Noddings believes the goal of living and working with preservice teachers in a caring community is reached by having fidelity in teaching and teacher education through an approach that includes a four-step process of modeling, dialogue, practice, and confirmation.

The most effective way to ensure that preservice teachers will treat their children in a caring manner is to model caring interactions for them. Approaching university courses through a caring lens does not imply that academic rigor is less important. The goal of teacher educators shall be to “examine the [academic or professional standards] reflectively to see how they may be constructively interpreted to serve the caring community” (Noddings, 1986, p. 503).

The second aspect of Noddings’s (1986) approach to teacher education is dialogue. This means that teacher educators should empower their preservice teachers to make autonomous decisions for the sake of their own future students by confronting them

through dialogue and offering ideas, strategies, and theories to be analyzed, discussed, critiqued, and considered. The intended outcome of this dialogue is not to have our students think like their instructors do, but to have them think for themselves. The objective should not be to produce teachers who will subscribe to a non-caring system that simply asks children to achieve discrete learning goals (Noddings, 1986).

Practice, the third component, is inherent in teacher education, but typically it is not caring relationships that are being practiced. Instead, preservice teachers practice, reflect, and are tested on subject content and methodology. Carefully chosen cooperating teachers and university instructors, however, can help preservice teachers fully understand the educational impact of caring relationships. The most appropriate lesson for preservice teachers would be for them to observe their professors, cooperating teachers, and colleagues working together to develop caring relationships.

The final element in Noddings's approach is confirmation. When the best possible motive is attributed to a student, that student's "best image" (1986, p. 505) is being confirmed. In the process of confirmation, the teacher educator holds the preservice teacher's ideal self up for reflection and helps the preservice teacher see himself or herself mirrored in the reflection. It is only through dialogue and practice that confirmation can occur.

Therefore, if teacher educators accept the commonly held belief that caring is a fundamental, essential part of teaching, then teacher education programs should be a primary site for the development and sustenance of care-centered pedagogical beliefs and practices (Goodlad, Soder, & Sirotnik, 1990; Rogers & Webb, 1991). Like Noddings (1986), the authors believe that the goal of education, including teacher education, is to produce caring individuals.

The Relational Zone

Lisa Goldstein (1999) made the connection between Vygotsky's (1978) zone of proximal

development (ZPD) and Noddings's (1984) ethic of care. She uses the terminology "the relational zone" to demonstrate that it is the affective qualities of the teacher-student relationship that allow the teacher to gain entry into the students' cognitive zone of proximal development. Goldstein (1999) states that the "interpersonal relationship can be considered a significant factor in cognitive development" (p. 655).

My intent is not to suggest that Noddings' work and Vygotsky's work match up in perfect alignment, but to use Noddings' understanding of caring, and the vocabulary which emerges from it, to highlight the interrelational dimensions of the zone of proximal development, dimensions which Vygotsky alluded to but never detailed. (Goldstein, 1999, p. 661)

The connection between Vygotsky's (1978) and Noddings's (1984, 1986) work illustrates the cognitive potential for growth by students involved in a caring relationship with more capable others—teacher educators. Using the ZPD, which is never static but rather in constant flux, Goldstein (1999) addresses the changes and adaptations both the adult and the student must make as new meanings are negotiated. As students grow in their individual zones of proximal development, the teacher must constantly modify content and strategies to best meet the needs of the student. Both teacher and student are changed by their experiences. The student experiences lasting change in his or her cognitive development. The changes the teacher makes, due to his or her more sophisticated understanding of the problem, are more temporary in nature because their focus is to support the student until a new level of independence has been obtained.

Teacher educators who utilize the relational zone "choose to look upon the act of teaching as an opportunity to participate in caring encounters, [and] will be teaching their students not only how to solve the intellectual problems at hand, but also will be teaching them how to care" (Goldstein, 1999, p. 666). Implications of Goldstein's

work on the relational zone include the suggestion that empirical research be done on teacher-student dyads.

Undertaking this research in settings where teachers approach their interactions with students as caring encounters, as well as in settings where this is not the professional norm, will provide insights into teachers' beliefs about and understandings of the interaction of affect and cognition. (Goldstein, 1999, p. 669)

This call for empirical research between teachers and students exemplifies the theoretical framework under which the mathematics and science methods classes were reconceptualized. Knowing that many of the students carried mathematics and science fears or phobias with them as they entered the two classes, the courses were redesigned to specifically focus on and model caring interactions as a way to facilitate both the mathematics and science content and the methods of teaching mathematics and science to young children.

The current study applies Noddings's (1984) conception of fidelity in teaching and teacher education, and the related emphasis on modeling, dialogue, practice, and confirmation, to two university methods courses and field experience. The purpose here was not to evaluate whether the preservice teachers were in fact caring or living up to Noddings's expectations of fidelity. Nor was it an attempt to suggest that Noddings's conception of fidelity is the best or only way to provide a caring teacher education program. Rather, the teacher education experiences cited provide concrete examples of the ways that the ethic of care and fidelity in teaching and teacher education can be integrated and manifested in teacher education programs. The findings further illustrate the researchers' efforts to operationalize the "relational zone" (Goldstein, 1999) by modeling caring practices and presenting the preservice teachers' understandings of the caring practices, as well as their ability to transfer these practices to their field classroom.

Establishing Caring Practices

We all have images of "how to do school" (Tomlinson, 1999), and it is this crucial basic philosophy that allows colleagues to attempt to collaborate and co-teach. The professors involved in this collaboration had been colleagues for one year before they realized that their basic philosophy of education was the same, even if their language and theoretical orientation were different. One professor often spoke about attachment theory, and his orientation was rooted in psychology. The other spoke about the ethic of care, which is rooted in feminism and moral education. However, both felt that the best way to influence and teach preservice students was by first establishing a relationship with them, and through this relationship deliver the content and methodology. As the professors, we agreed to use Noddings's (1984) ethic of care and fidelity structure for the purpose of this research project. Individuals involved in the ethic of care begin by establishing a relationship with another person. It is this affective relationship that allows teacher educators to attempt to make a critical difference in the lives of their students via their university coursework.

Reconceptualizing Teacher Education Courses

The report from the National Commission on Mathematics and Science Teaching (2000) directed attention toward the urgent need to improve students' performance in mathematics and science. The primary message of the report was that U.S. students' performance in mathematics and science is unacceptable. One of the proposed solutions to the problem is to engage in an aggressive effort to improve the quality of teacher preparation programs. This study is timely in that the authors are working towards helping preservice teachers achieve an increased understanding of mathematics and science content by scaffolding in their relational zone.

However, when the authors first discussed the possibilities of reconceptualizing the methods classes, they did not realize

that they were entering into professional development opportunities of their own. This may appear to be a gross oversight on their part; nevertheless, they were so focused on the students, and on reconceptualizing the classes, that they left themselves out of the equation. It was not until later discussions, when their struggles emerged, that they realized the growth that had already occurred and the potential for future growth.

Loucks-Horsley et al. (1987) note that even a single new practice will further develop a teacher's knowledge, skill, and performance. Key features involved in implementing a new practice or change are explained, along with how the authors are operationalizing each feature.

1. When implementing a new practice, it is aimed at changing curriculum, instruction, management, or all three. It is usually developed elsewhere, but can be developed by the teachers involved. In reconceptualizing the methods classes, no plan was followed. The authors relied on their early childhood teaching experiences, research on the integration of mathematics and science, and current practices in their local district.

2. The practice or change is introduced across a period of time, and teachers are given different kinds of help and support, tailored to their changing needs. The authors have a vision of what they would ultimately like to see happen in the methods classes. They broke the project into yearly increments that made it more manageable. The methods classes are offered every fall semester; the spring and summer semesters provide the time to further discuss, strategize, and modify for the next phase of integration.

3. Leadership provides a combination of direction, guidance, support, and clear expectations for the outcomes of implementation. Professors have autonomy regarding how to design and implement methods classes as long as the classes meet the National Council for Accreditation of Teacher Education (NCATE) and state accredita-

tion standards. However, due to the size of data collected and the lack of funds or resources to hire help working with the data, slow progress is being made as the authors chunk the data and work with pieces each semester.

Given the above framework, the current study was designed to explore how the ethic of care and fidelity in teaching and teacher education can be manifested in science and mathematics courses for preservice teachers. The purpose of this study was to integrate caring practices within two methods courses and examine the students' journals to discover their understandings and ability to practice caring methods in their field classrooms.

Method

Description of Program

The structure of the early childhood program allows for mentoring opportunities by teacher educators, both at the university and in the field. In March of the sophomore year, students apply to the early childhood program. Thirty applicants are selected and admitted to the program for the following fall semester. Once admitted, the students' classes are blocked and they travel together as a cohort for the next four semesters, or blocks, until graduation. In Block I of the program, the juniors spend time in preschool settings. These settings include both public and private agencies that allow the students to interact with children ages 2 through 5.

In Block II of the program, each student is placed with a mentor teacher for approximately one and a half days per week. The mentors are kindergarten, 1st-grade, or kindergarten/1st-grade teachers. (The program does not place students in 2nd- or 3rd-grade classrooms because there are not enough classrooms in the county for both the early childhood and elementary field-based programs.) The students spend Blocks II, III, and IV (one and a half school years) with the same mentor. The children change in Blocks III and IV because it is a new school year, but the preservice teacher

stays with the same mentor. In the spring of each year, the classrooms have a Block II and a Block IV student. The organization of the program provides two mentors for each Block II student, an experienced certified teacher, and a Block IV student in the program. In this way, the program strives to provide a long-term supervised apprenticeship for the students.

Because teaching is one of the few professions with no formal apprenticeship, the first-year teacher is virtually thrust into a classroom situation with only a brief stint at student teaching and his or her own schooling experience upon which to draw. . . . Newcomers to the teaching profession need support and encouragement. They need to know that teaching is never problem-free and that the beginning is uniquely challenging. They need to know that others have experienced the problems they now face, and they need assistance to see that the problems become variables related to growth and not obstacles leading to withdrawal from the profession. (Loucks-Horsley et al., 1987, p. 87)

Loucks-Horsley et al. (1987) believe that the three- to four-month student teaching experience that is part of most teacher education programs is not enough time to be considered an apprenticeship. Student teachers gain invaluable experience while student teaching, but the set-up of the classroom, organization of the classroom, parent negotiations, and major problems that arise are most often handled by the cooperating or supervising teacher. Therefore, an apprenticeship could look like more time spent in schools by preservice teachers to better prepare them to face the challenges of being a first-year teacher. Or first-year teachers should be considered apprentices and should be provided with a mentor or supervisor to work with them collaboratively or cooperatively while they negotiate the roles of being the teacher in charge.

In Blocks II and III, the students create thematic units that are taught under guidance of their mentor teacher and university supervisor. In Block II, the students

design and implement a one-week unit and spend a week in April as the lead teacher in their classrooms. For this week, they are excused from taking their university classes. In Block III, in November, the students design and implement a two-week unit on a different topic and are released from their university classes for two weeks. Block IV involves what is traditionally referred to as "student teaching." However, instead of having a "brief stint at student teaching," the students are in their third semester with the same mentor, which creates a more fluid co-teaching enterprise.

The three Blocks spent in the field with the same mentor offer the students opportunities for cognitive and intellectual growth, as a relational zone is established in Block II and the mentor and university supervisor implement specific strategies, with each student targeting his or her zone of proximal development. The program offered a true field-based experience, in addition to apprenticeship opportunities. However, the methods classes were not congruent with the field-based philosophy.

Participants

In the Fall of 2001, a cohort of 26 undergraduate students, all women, were enrolled in the Early Childhood Mathematics Methods, Early Childhood Science Methods, and Early Childhood Observation and Participation (a two day a week practicum in one of the local elementary schools, in grades pre-kindergarten, kindergarten, 1st, or multiage K/1) courses at a large research university in the southeastern United States. Twenty undergraduate students, all women, were enrolled in the Fall of 2002. These courses were required for the students' professional development sequence and provided the students with their third long-term fieldwork placement. The two methods courses met twice a week and the observation course met once a week. The students were aware of the focus on and commitment to the integration of the mathematics and science methods courses through the syllabi, discussions, and joint assignments.

Participation in this study was open to all students in the cohorts; data compiled for the study were part of the assignment requirements for the classes. Each student responded to 10 prompts provided by the professors and submitted their reflections via E-mail; thus, the journals were named "ejournals." A total of 24 students volunteered for the study in 2001; all 20 students volunteered in 2002.

The data were independently read and coded; they were analyzed horizontally, by looking at each individual student's prompts for the ejournal entries, then grouped by similar codes, grade level, and topics. Findings that emerged were highlighted, explored in greater depth, and interpreted. These key findings are addressed in the following section.

Results and Discussion

In the first year of the collaboration (SY 2001-2002), the syllabi were aligned by choosing a common textbook, having common assignments that focused the students on the integration of the content and applying the ethic of care in their field classrooms, and working closely to establish common language and strategies of care to use in each class. In the second year of the study (SY 2002-2003), we continued to use the same text, language, and teaching methods. However, we discovered that one of the assignments, specifically the ejournal reflections, needed to be more focused. Based on the baseline data received from the students in the first year of the research project, future data collection around this assignment was redesigned to focus on more reflective and specific questions regarding the students' understandings of caring practices. The authors also co-taught for six class periods, for a total of 12 hours, with a focus on integrating the concepts of plant life and weather; a third topic included a variety of activities that were part of several of the students' units.

The most common reaction from the preservice teachers regarding the attempt at integrating a caring focus with the mathematics and science methods courses was

that they never knew that caring was even considered a content area. Until they took these classes, the preservice teachers believed that caring was an inherent trait that most teachers had, even though all of them could list several teachers they had had whom they felt were uncaring. When the authors moved beyond this reaction and delved into the caring content, the preservice teachers started to recognize the words and actions as evidence of caring, and through the course assignments, they had to actually practice caring while also teaching mathematics and science lessons. Evidence of the preservice teachers' understanding of caring and their ability to transfer caring practices to their field placements are revealed via their ejournal entries.

The ejournal entries are presented via the four categories: modeling, dialogue, practice, and confirmation. Within each of these four categories there are two subsections. One subsection provides information on the teacher educators' ability to utilize the ethic of care in their methods courses. This ejournal prompt asked our students to reflect on our ability as teacher educators to display Noddings's (1986) four components. It is important for preservice teachers to be able to recognize the actions in others as a way to apply the ethic of care theory. The second subsection discusses the preservice teachers' ability to transfer the ethic of care into their field placement classrooms.

Modeling

The most effective way to ensure that caring takes place is for teacher educators to treat their preservice teachers with care. It is this relational zone, which demonstrates the affective qualities of the teacher-student relationship, that allows the teacher to gain entry into the students' cognitive zone of proximal development. Goldstein (1999) states that the "interpersonal relationship can be considered a significant factor in cognitive development" (p. 655). The caring behaviors portrayed in the relational zone then provide a model

for the preservice teachers to use in their field classrooms (Noddings, 1986).

Teacher Educators. Efforts made in the methods classes for modeling included greeting the preservice teachers at the beginning of class, interacting with them in a caring manner throughout the classes, using specific caring words and gestures, providing specific information on caring practices via handouts, class discussions, and asking the preservice teachers to describe the actions of their professors that modeled care. Sarah explained that the professors “took the time to make sure we understood the concepts that they are teaching and do not make us feel stupid or embarrassed if we do have a question about something.” Scarlett said the professors “are always willing to listen to a problem and offer advice or help.” “Both professors always welcome us at the beginning of the class time, and throughout the class time, they give us time to exhibit feelings as they do themselves” (Lindsey). “In the classes you both always demonstrate how to do something with our own classes, you give us examples, and allow us to interact with each other” (Audie).

As teacher educators it was uncomfortable, at first, to highlight the words and/or actions as evidence of caring. However, we soon moved past this discomfort because the preservice teachers started to label the actions and words, oftentimes in humorous ways. It was not uncommon to hear such statements as, “Thank you for asking about how we are doing; that is a very caring gesture.”

Preservice Teachers. Madison discussed the relationship she had with her mentor: “My mentor and I have a wonderful caring relationship where each of us acts as the caregiver and cared for at different times,” as well as her ability to model caring for her field placement children. “I encourage children verbally, smile and show appropriate affection through touch.” Skipper described a situation in her kindergarten classroom where she hugged an unhappy child, then saw the effect of that gesture when another student hugged the child as well.

The other day, a child named Tyler was having a rough day. He was just crying a lot for no reason. Some of the children were giving him a hard time and I came up to him and said, “Maybe you just need a hug.” So I gave him a hug and another child saw and came up and gave him a hug too.

Many of the preservice teachers expressed the idea that modeling caring behavior was part of their job of being a teacher. Although many teacher educators would agree with that theory, the authors’ experiences in schools indicate that the theory is often wrong. We have seen many teachers act in an uncaring manner towards children. While we were not surprised that the preservice teachers found it difficult to separate who they are as caring individuals with modeling caring behaviors in their classrooms, it is troublesome because not all caring individuals are caring teachers. It was our hope that the preservice teachers would be cognizant of the effects that modeling caring interactions had on others, be it parents, other professionals in the school, and especially the children in their classrooms. We wanted the preservice teachers to understand that caring is a choice each of them make.

Dialogue

The goal of teacher education should be to empower preservice teachers to make decisions for the sake of their future students. We endeavored to confront preservice teachers through dialogue by offering ideas, strategies, and theories to be analyzed, discussed, critiqued, and considered. The intended outcome of this dialogue was not to have the students think like we did, but to have them think for themselves (Noddings, 1986). Preservice teachers often feel insecure with the content they teach in their field classrooms and tend to ask for one “right” answer in lessons, instead of using open-ended questions that elicit a variety of responses and information from their students (Moore, 2001). With the latter approach, they would strive for a true dialogue with their children instead of having the

children fill in the correct answer.

Teacher Educators. Many of the students' ejournals reported caring language as evidence for dialogue. The preservice teachers explained how we used open-ended questions, humor, and the set-up of the classroom in "such a way that we each had to personally construct a meaning out of all of the content" (Scarlett). While we are pleased that many of the students felt this way, in future classes we plan to use very specific language that encourages the preservice teachers to expand and share their thoughts. These citations of caring language are not so much evidence of dialogue, but rather of modeling.

Several students did demonstrate a closer understanding of dialogue as outlined by Noddings (1986). "In our class they let us talk about how we feel about ideas and contribute to conversations. We are not expected to be like them. They allow us to be ourselves and are accepting of our ideas. We talk through disagreements instead of 'just do it my way' approach" (Sarah). "We are constantly taking roles and helping each other out. The activities we are doing force us to think critically and help each other" (Staci).

Preservice Teachers.

While working with the children, I try to encourage the children to talk and explain what they are making and thinking about. When I am working with the children on a lesson, I am slow to help them out with the answer to a problem, but rather ask helpful questions in order to further their thinking about the activity. (Grace)

Grace provided a clear example of her ability to transfer the concept of dialogue in her field classroom. Other students cited conflict resolution as an example of dialogue. Audie explains,

When two or more of my students start to have an argument or they come to me to tattle on someone, I ask them what they can do. How can they stop the problem? This forces them to stop and think about the problem and try to fix it for themselves before coming to someone else to fix it.

Conflict resolution is a program used in many of the schools where the preservice teachers are placed, as well as being taught as part of the teacher education program. The irony of the situation is that all of the schools that have a conflict resolution program rely on discipline systems that utilize punishments and rewards. Many class discussions concentrated on finding the balance between being a caring teacher and following the classroom's discipline policy. Conflict resolution puts the ownership of the problem back on the child, teaches or models a skill, and works with the child on critical thinking skills. The discipline systems punish the child by having that child put his or her name on the board or pull a card; neither of which do anything to teach the child a new skill. Instead, the child is punished for not having a required social skill or following a rule. The preservice teachers faced a common struggle many teachers encounter, that of how to be a caring teacher in an education system that may not support their efforts.

Practice

Noddings (1986) states that the most appropriate lesson for preservice teachers would be for them to observe their professors, cooperating teachers, and colleagues working together to develop caring relationships. As part of a teacher education program, students spend many hours practicing content and methods within their field placement but do not often practice the ethic of care. The second year of the study, the authors co-taught for 12 hours, totally integrating the mathematics and science curriculums as one avenue to model the practice of care. In addition, we also worked closely with the mentors in the field and most of the course assignments were field based, to further emphasize the theory-to-practice link. The program is designed to foster collaborative learning and we encouraged the students to work together on their units and to look to other professors and mentors for outside help as well.

Teacher Educators. Several students reflected on the content connections of the

methods classes and their field placement, as well as the teacher educator-mentor collaboration, as evidence of practice. "Our methods classes provide us many opportunities to overlap things that we do in class with things that we do in our field placement" (Kayla). "We also see and hear them working with our mentor teachers and our other professors" (Carissa).

Other students commented on the co-teaching workshops that were planned throughout the semester of the second year of the study.

I was really impressed by how our professors practiced caring by doing the plant workshop. That was a VERY informative day and we really made the most of our time in the classroom. It showed me that both my professors were really working together to help us teachers in an area that we request lots of help (in tangible resources) and that they cared enough to make it fun and informative for us. (Hermione)

Deidra also talked about the co-teaching experience: "They realize that there are many connections between math and science. Rather than ignoring this fact, they show caring and practice by cooperating to produce a high-quality class that shows the different aspects of math and science individually and together."

Many students wrote about the hands-on activities in the methods classes and the experiential learning environments. "The hands-on experiences we do in the classroom are great. The activities we do we can incorporate into our unit or just in the classroom" (Smiley). These activities were planned to further the connection between the preservice teachers' field placements and the methods classes. While this element of practice is very important, especially given many of the students' math and/or science fears, the hope for the reflective assignment was that the students would look beyond to the interactions of caring between the professors and between the professor and their mentors. However, we realize that for students beginning to gain confidence in one or both content areas, this

was probably one of the most important aspects of the classes. Through the hands-on activities, the preservice teachers expanded their knowledge of math and/or science content, thus increasing their confidence in their ability to teach math and science in their field classrooms and in future classrooms.

Preservice Teachers. One of the main focuses in the integrated mathematics and science classes was to demonstrate how to overlay the math and/or science objectives with caring practices. The preservice teachers were asked to include caring gestures, words, and actions on lesson plans. Hermione's ejournal reflection captures her progress towards meeting this goal:

I try to engage in at least five caring interactions a day, plus stopping and talking to each child. I have found that when I am thinking about the aspects of caring, my actions and words are different. I tend to become more engrossed in the child's needs and forget my own to a greater degree. I also tend to confirm the child during and after the interaction to a greater extent. For example, one child in my class began to cry about the terrorist strike (this happened a while ago). I was thinking about the aspects of caring and tried to use them. I pulled her aside to a comfortable spot and sat in close proximity. I asked her to tell me what was wrong and was totally engrossed in her needs. I discussed the situation with her for a long time, reassuring her that we were safe here and that the president was taking care of everything. I allowed her to discuss all of her fears and worries and reassured her that we would be all right. (Hermione)

Hermione's ejournal reflected the thinking of several students. "I try to practice caring in my internship by treating all my students with the same caring, positive, and interested demeanor." Treating all the children the same is not practicing caring. Part of the verbal mantra as teacher educators was, "Practicing caring means treating children differently because they all have different needs." Hermione believes that because she is a positive, caring person she

must be practicing caring behaviors. Being a caring person does not mean that you apply caring practices in your classroom, or that every child feels cared for, or that you highlight your caring behavior to serve as a model for your children. The authors' focus was that caring practices are specific to each child and situation and represent a choice for a teacher, not an inherent teacher characteristic.

Hermione goes on to say, "I never disagree with my mentor in front of the students or parents, or other teachers. If I have a question or concern, I approach her when it is just her and I." The authors realize the preservice teachers are in a precarious situation when interning in someone else's classroom; however, by always agreeing with the mentor when in front of the children, the children do not see two adults working through differences or using conflict resolution skills in a caring manner.

Confirmation

Attributing the best possible motive to a student is the act of confirming that student (Noddings, 1986). Working with the preservice teachers to learn the content of math and science, as well as the strategies to teach math and science, is often a difficult task. Teacher educators spend much time confirming the students as they strive to become the teachers they want to be. The goal was that the preservice teachers could then transfer how it feels when they are confirmed into confirming actions for their field placement children. In order to reach this confirming goal, the authors practiced confirming language and behavior in the methods classes.

Teacher Educators. Most of the students' ejournals revealed their understanding of confirming by citing verbal or written examples from one or both of the professors. There were more specific examples for the mathematics professor than there were for the science professor. One reason might be that the mathematics professor is female and so were all of the participants. A second reason might be that the mathematics class was the third class the preservice teachers had had with that professor, but it

was the first or second class they had with the science professor. Following are two examples to illustrate the difference in specificity. Carissa said, "[My science professor] demonstrates confirmation by verbally telling us things like 'good idea' or 'interesting way of thinking about that.'" Alicia wrote about the mathematics professor:

I see confirmation with caring shown on our graded assignments. For every assignment there are some type of notes written that confirms that you have really read and thought about what we have written. This is so much better than a grade at the top. We know why we got things wrong and what to do or what not to do next time. She grades our assignments in a way that will help us most. You not only comment on what we did wrong, but what we did right.

Although the examples of confirming were more specific for one teacher educator, both interacted with the preservice teachers in confirming ways. Weekly discussions took place between the authors, with both sharing the progress being made on his or her work with a particular student, what strategies had been tried, and how the other could support the efforts.

Preservice Teachers. Elise expressed how she and her mentor worked together to confirm their children. "We always try to find the best in what the children have done in class. Rather than pointing out all the little things that have gone wrong, we will focus on what the children have done right." Lola's example is more specific by including her confirming language.

One day last week we were practicing writing numbers. This little girl had a very hard time writing the number 5. She tried and tried and was extremely frustrated. I worked with her, one on one. Each time she got a little part of the five right, I would urge her to keep going by saying, "OK, keep going the five is looking good so far. Now let me see you do the other half of the five because you did a good job on the first half." She finally got the hang of it and I told her she did a wonderful job and that I liked the way she kept practicing. She was so proud of herself!

The examples provided by the preservice teachers demonstrated that they understood that confirming was more than just praising the students for doing good work or following the rules. Confirming involves working with children and acknowledging their efforts to be successful. Madison sums up confirming by saying, "I always try to provide feedback to students on what they are doing well, along with constructive criticism. Although I praise students every now and then, I really work to give good encouragement that is more meaningful and motivational."

Conclusion

The authors did not expect that the preservice teachers would recognize all the examples of caring throughout the two methods classes, nor be able to apply caring content flawlessly in their field classrooms. The goal was to bring the content of caring to a cognizant level. Many of the preservice teachers embraced the caring content, understood that caring was a choice, and practiced caring skills with a variety of children, but especially practiced them with children with whom they had not previously connected. However, some of the preservice teachers did not move beyond the notion that because they believed themselves to be a caring person they therefore were also a teacher who practiced caring interactions. Our hope is that they use the resources that were provided for them if they someday come to understand the difference.

The data presented illustrate our attempt to operationalize the "relational zone" (Goldstein, 1999). As previously stated, teacher educators who utilize the relational zone "choose to look upon the act of teaching as an opportunity to participate in caring encounters, [and] will be teaching their students not only how to solve the intellectual problems at hand, but also will be teaching them how to care" (Goldstein, 1999, p. 666). The goal as teacher educators was to examine the cognitive potential for growth by students involved in a caring relationship with more capable others. As

the preservice teachers grew in their individual zones of proximal development, we were constantly modifying the caring, mathematics, and science content and strategies to best meet their needs.

Caring relationships between teacher educators and preservice teachers at the university level are often minimal or nonexistent. In this article, the findings illustrate that successful preservice teacher education programs can focus simultaneously on building relationships with the students while continuing to impart curriculum content. If one were to look at the variety of courses offered in a teacher education program and try to determine the most likely places to emphasize caring, mathematics and science methods courses would probably not be the first courses to come to mind. The findings suggest that building caring relationships is crucial to the preservice teachers' openness to receiving the content, as well as their ability to translate the content to the students they teach.

A powerful aspect of this study is that we made the preservice teachers aware of our discussions by sharing our ideas and plans for future research and asking for feedback. By making these efforts visible, the authors presented a model that reinforced the ethic of care, as well as demonstrated their efforts to increase their knowledge and ability to effectively teach mathematics and science content.

Early childhood educators understand that building caring relationships with children is crucial to their emotional and intellectual development. However, this relationship is often missing from early childhood preservice teacher education programs. We believe that it is the teacher educators' responsibility to model trusting and caring relationships with the preservice teachers if the preservice teachers are to enter into trusting and caring relationships with the children they teach.

Plans for Future Studies

Based on the successful two years of math and science integration, the authors have

expanded their integration to include the social studies methods class. This has proven to be an incredible asset to the preservice teachers, because many of them cite that due to the pressures of the state's reading mandates, social studies content is often not formally taught in their field classrooms. Through the math/science/social studies workshops, the preservice teachers have become even more familiar with the state's content standards and have learned how to integrate social studies content with their math and/or science lessons. Each year, the teacher educators meet to refine each of the workshops and to expand on the lessons and activities taught.

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